

Work Order ID 61346

Wednesday, August 18, 2010 4:11:02 PM



Page 1

Item ID: D350-748-141TRN

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Turning Detail

Start Date: 8/19/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 9/2/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

MF

Date: *10-8-18*

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
D350-748-141	Rev E

100



Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

0.00

0.00

1-Fill tube with sand & install plugs on both ends as per Folio FA648
2-Turn first side as per Folio FA648
3- File transition lines smooth.

OK 10/08/24

1 *0*

110



QC

Quality Control

QC1- Inspect dimensions to dimension sheet

Memo

0.00

0.00

OK 10/08/24

1 *0*

120



Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

0.00

0.00

1-Turn second side as per Folio FA648
2- File transition lines smooth.
3-Scribe Part & Batch as per Dwg D350-748-141

OK 10/08/24

1 *0*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130  QC Quality Control	QC1- Inspect dimensions to dimension sheet Memo	0.00 0.00							
			amt 10/08/24			1	0		
140  QC Quality Control	QC8- Inspect parts - second check Memo	0.00 0.00							
			Soboslos			10			
150  Crosstubes Crosstubes	Large Fab Memo Grind machining marks	0.00 0.00							
			amt 10-09-29						

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Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

160

Outsource process - Heat Treat

0.00



Outsource1

Memo

0.00

Outsource process - Heat Treat

Issue P/O: 12699

Heat Treat to min 180 KSI As per Dwg D350-748-141

(MIL-T-6736 OR AMS 2759-1C)

Sand Blast tube after Heat Treat

Possible Supplier: Vac Aero

Ensure Certificate of Conformity is attached

CL 10/10/06 (1)

170

Receive & Inspect for Damage & Mat'l Certs

0.00



Packaging

Memo

0.00

Packaging

Ensure certificate of conformaty is attached

P. 14/10/06 (1)

180

QC6- Inspect dimensions to drawing

0.00



QC

Memo

0.00

Quality Control

8/10/10/05

FD

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190 Packaging	Packaging	0.00				①			
Packaging	Memo Identify and stock in kanban rack Location: <u>X tube</u>	0.00							
200 QC	QC21- Final Inspection - Work Order Release	0.00							
Quality Control	Memo	0.00							

SAD
10-11-22

CK 10/11/22. *[Signature]*

MF
10-11-22

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Picklist Print

Wednesday, August 18, 2010 4:11:02 PM

Page 1

Work Order ID: 61346



Parent Item: D350-748-141TRN



Parent Item Name: Crosstube Turning Detail


Start Date: 8/19/2010

Required Date: 9/2/2010

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
IPP Rev B Removed polish 08.04.02 EC verified by : DD
IPP Rev C Remove LPS-3 08.06.23 EC verified by DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6017-115  Crosstube Material		Manufactured	No			110	Each	14.0000	1	1			

Location

Loc Qty

Loc Code

LG

14

32912

14

1 *anz* 10/08/24

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NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 61846
Description: Crosstube Assembly (AS350/355 High Fwd)		Part Number: D350-748-141
Inspection Dwg: D350-748-141 Rev: D Rev: <i>E Stolz</i>		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.240	✓		Vern ML-7
	2.180	+0.005/-0.000	2.180	✓	"	"
	2.180	+0.005/-0.000	2.183	✓	"	"
	2.237	+0.005/-0.000	2.241	✓	"	"
	2.272	+0.005/-0.000	2.277	✓	"	"
	2.306	+0.005/-0.000	2.311	✓	"	"
	2.339	+0.005/-0.000	2.344	✓	"	"
	2.339	+0.005/-0.000	2.344	✓	"	"
	0.062	+/-0.010	.062	✓	R-G	N/A
	4.26	+/-0.030	4.280	✓	Vern	ML-7
	R0.063	+/-0.010	R.063	✓	R-G	N/A
	R0.50	+/-0.030	R.050	✓	R-G	N/A
SIDE B	2.240	+0.005/-0.000	2.240	✓	Vern	ML-7
	2.180	+0.005/-0.000	2.181	✓	"	"
	2.180	+0.005/-0.000	2.185	✓	"	"
	2.237	+0.005/-0.000	2.242	✓	"	"
	2.272	+0.005/-0.000	2.277	✓	"	"
	2.306	+0.005/-0.000	2.311	✓	"	"
	2.339	+0.005/-0.000	2.344	✓	"	"
	2.339	+0.005/-0.000	2.344	✓	"	"
	0.062	+/-0.010	.062	✓	R-G	N/A
	4.26	+/-0.030	4.280	✓	Vern	ML-7
	R0.063	+/-0.010	R.063	✓	R-G	N/A
	R0.50	+/-0.030	R.500	✓	R-G	N/A
	110.27	+/-0.060	110.280	✓	M-tape	AM-01

Measured by: <i>amf</i>	Audited by: <i>S</i>	Prototype Approval:	N/A
Date: 10/08/24	Date: 10/06/25	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	06.11.09	New Issue (P/O D350-748-101)	KJ/JLM	
B	07.10.24	Dwg Rev updated	KJ/EC/DD	<i>[Signature]</i>

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Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
R 2009-10-29
JWP

E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. E
CHECKED	RF	D350-748-141	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DE APPR.	RF	DATE 09.09.30	
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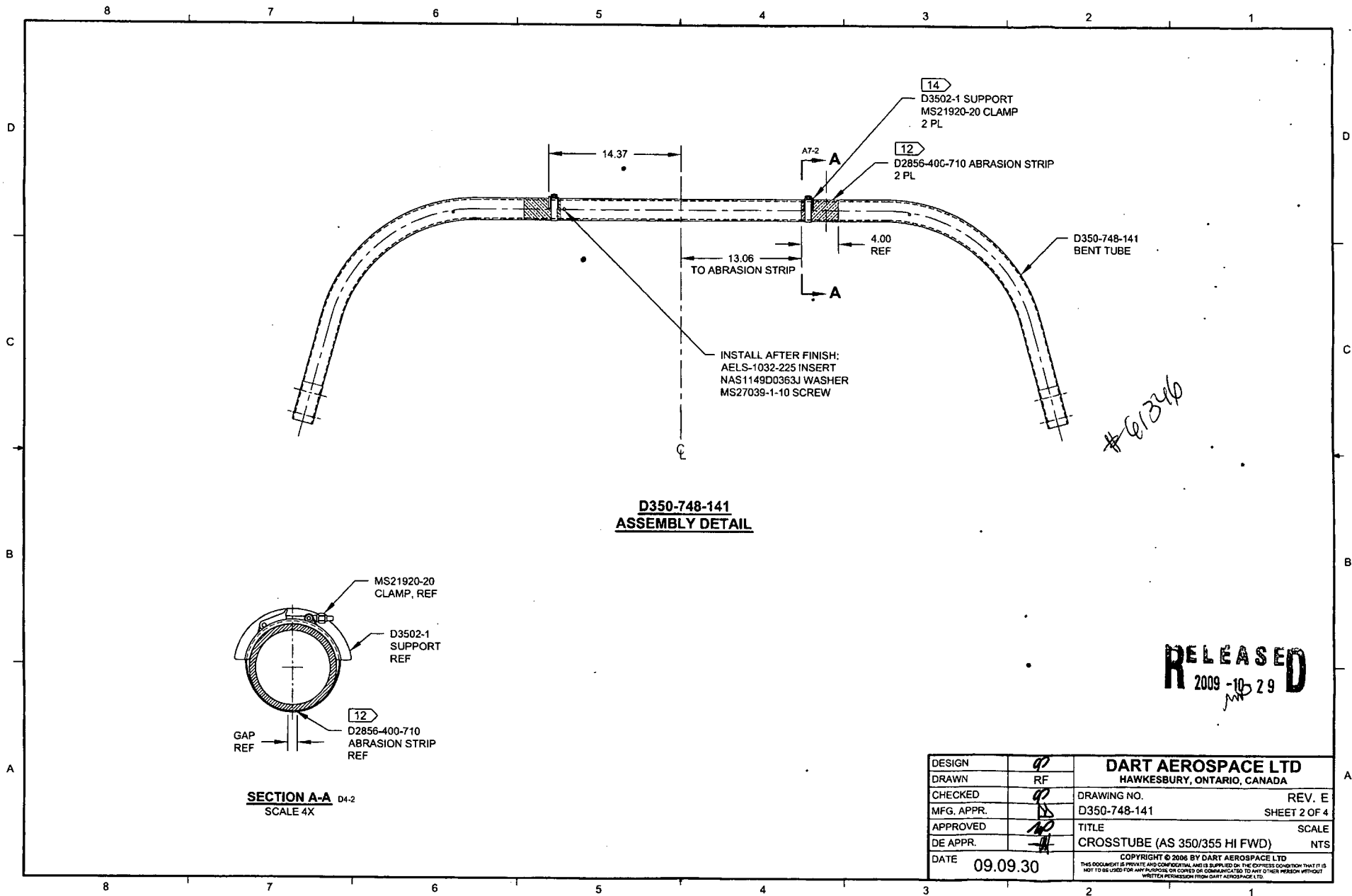
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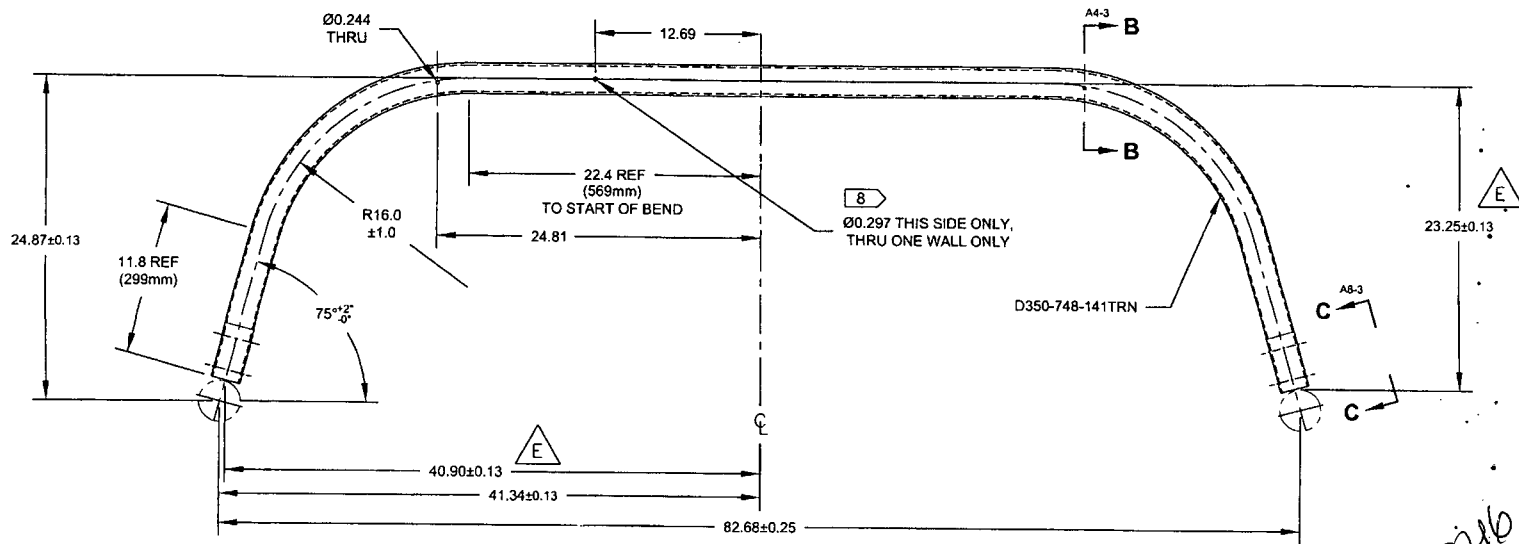
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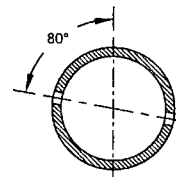
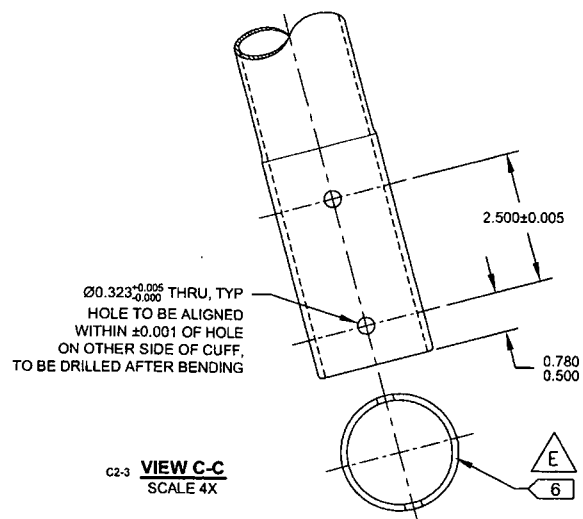
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D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B 03-3
 SCALE 4X

RELEASED
 2009-10-29

DESIGN	QP	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	QP	DRAWING NO.	REV. E
MFG. APPR.	DS	D350-748-141	SHEET 3 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	10	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

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VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No.: R105468102

OAK 123636-1



HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489



2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6L 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380



QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

10/27/2010

MM / DD / YYYY

PAGE: 1

1DAR01

BILL TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
10/27/2010		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
12699		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D350-748	-141/-121 TRN	EA	11	11	
<p>Process Specifications: Procedure: 4353 HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1E 100% HARDNESS CHECKED AS PER ASTM E-18 40/45 HRC MATERIAL: 4130</p> <p>7 PIECES D530-748-141 TRN B61135, B61136, B61137, B61138, B61345, B61346, B61347</p> <p>4 PIECES D350-748-241 TRN B61313, B61315, B61316, B61314</p> <p><i>Sidolator</i></p> <p>100% HARDNESS TESTED <i>day: 11/29</i> <i>44/45 HRC</i> <i>2700/10</i> <i>VALIO TH 29 Q.C.</i></p>					

I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.

Authorized Q.C. Inspector



METAL TREATING INSTITUTE



VACUUM BRAZING · HEAT TREATING · SPECIAL PROCESSING · FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL · PLASMA AND OTHER COATINGS